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## THE TREATMENT OF UTERINE TUMORS BY IRRADIATION\*

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### FIBROMYOMAS OF THE UTERUS

The two general types of tumors in which irradiation has been proven of definite, and I think superior value, are in the treatment of fibroids and carcinoma. At the present time it is not recommended that all fibromyomas be treated by any one method. As we have reported previously (Pfahler and Vastine—Fibromyomas of the Uterus, Proc. Amer. Roent. Ray Soc., Sept., 1932), approximately 33% of negroes, and 10% of white women over 20 show fibroids at autopsy, and 25% of all women over 25, and 50% over 50 years of age have fibroids (Ewing). When they give rise to hemorrhage, or cause pressure symptoms, they demand treatment. Armstamm and Nowotjelnowa, collected from the literature, prior to 1928, 11,805 cases of uterine fibroids treated by irradiation, which showed satisfactory results in 90 to 98 per cent of the cases. Since that date, six authors, Nemenow, Gal, Linton, Gamgarow, Strassman, and Schreiner have added 2,760 personal cases, with an average of 95 per cent cures.

### INDICATIONS

(1) Irradiation, we believe, to be the treatment of choice in all cases of fibromyoma in women near or beyond the menopause in which the tumor is smaller than a six months pregnancy, is not undergoing degeneration, and is not causing intolerable pressure symptoms; (2) Irradiation should be used by preference in patients of any age in whom there are marked organic heart disease, diabetes, nephritis, pulmonary tuberculosis, or other constitutional conditions, which would contra-indicate surgical re-

moval; (3) Irradiation should be used in cases with large fibroids which can not have immediate operation on account of anemia. This opinion is shared by Burnham, Corscaden, Murphy, and others. Very large fibroids are generally due to delays caused by fear of an operation. The patient would probably consent to irradiation while the tumor is still under a four months pregnancy size. (4) Irradiation should be used in all cases in which operation is refused, for one can not force an operation on a patient. I have come to this conclusion since I refused irradiation in a case that later died of hemorrhage.

### CONTRA-INDICATIONS

(1) Malignancy of the uterus or adnexa should be excluded so far as possible by a careful study of the history, by curettage, and a thorough pelvic examination, digitally and visually, not because the malignancy can not be treated, but because malignancy of the uterus requires a great deal more irradiation than is used in the treatment of fibroids, and therefore an accurate diagnosis must be made; (2) The tumor mass should not be larger than a six months and preferably not larger than a four months pregnancy, unless an operation has been refused or there is a definite contra-indication to operation, in which instance one is justified in treating a fibromyoma of any size; (3) Pedunculated or submucous tumors are less favorable; (4) Fibromyomas that have undergone cystic degeneration or are gangrenous, if the diagnosis can be made, should be operated upon; (5) In younger women, in whom there is still hope and desire for subsequent pregnancy, a myomectomy is the treatment of choice.

### ADVANTAGES AND TECHNIQUE OF ROENTGEN THERAPY

1—The roentgen rays are almost universally available—but the skill in their therapeutic application is not so universal. (2) The roentgen rays are more useful than radium, especially

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when the fibroids are large, for they produce a more direct and homogeneous effect on the tumor as well as on the ovaries. (3) Roentgen therapy can be applied usually without interfering seriously with the patient's occupation. (4) It is less expensive, and hospital costs are avoided. (5) The effect is produced more gradually, than either by operation or by radium. (6) It eliminates nervous shock, as well as any objection to intrauterine applications. (7) It produces no caustic action upon the endometrium.

*The technique of the application of the roentgen rays* in uterine fibroids has passed through evolutionary changes. Twenty-seven years ago, when I began treating fibroids, only low voltage rays were available, and therefore it was necessary to give all treatment through the abdomen and use many portals of entry. Now, since high voltage rays are available, we use 200 K. V., 4 M. A., 0.5 MM. cu. filter, at a distance of 50 cm., and in the smaller fibroids we make use of three portals as recommended by Holfelder, one anteriorly and one through each sacro-sciatic notch, with the central ray directed through the uterus. If the tumor is very large, more portals must be used and great care must be observed so as not to crossfire on the subcutaneous tissue and produce a fat necrosis. It is possible to give all the irradiation on one day, but this usually results in a serious radiation sickness. We, therefore, usually treat the patient with 50% doses serially through each of the three fields, until 100% is given through each field. In larger tumors or young people, twice this amount is needed. We avoid, when possible, giving more than a total 250% through any abdominal field, because of the danger of fat necrosis, fibrosis, and telangiectasis.

#### ADVANTAGE AND TECHNIQUE OF RADIUM THERAPY

(1) On account of the frequency of uterine fibroids of small size, often without symptoms, it must be realized that a patient may have a fibroid, and also have carcinoma of the fundus. Therefore, a dilatation and curettement is often necessary for an accurate diagnosis. Under such circumstances it is our rule to introduce radium at the same time, and thus eliminate delay, dissemination, and a second operation. Such radium treatment is at least a step in overcoming the patient's disease. (2) As a rule, one can

obtain from a competent pathologist a microscopical report within 24 hours, then if malignancy is present the radium treatment within the uterus can be prolonged for the maximum toleration effects. (3) A single 24 hour application of 150 milligrams of radium in a patient with a small fibroid will usually be sufficient to bring about an amenorrhea, and a cure. This is especially valuable for out of town patients. (4) If a polyp or endocervicitis is associated with the fibroid it will be successfully treated by this single procedure. (5) Radium usually causes a prompt cessation of hemorrhage, and produces a fibrosis when used to the above extent which eliminates any danger of subsequent hemorrhage. Therefore, radium must not be used when subsequent pregnancy is desired.

#### TECHNIQUE OF RADIUM APPLICATION

We have long been convinced of the superior value of larger quantities of radium used with high filtration, for in the treatment of uterine fibroid we not only want the effect on the interior of the uterus, but we aim to reach the ovaries and a considerable amount of fibroid tissue, both of which are relatively far from the uterine canal in terms of millimeters. Therefore, in 1926, (A New Radium Applicator for the Treatment of Uterine Carcinoma, Amer. Jour. Roent. and Rad. Ther., April, 1926, Vol. XV, No. 4, pp. 365-6.) I developed and described a uterine applicator for insertion into the uterine canal. It was designed to irradiate the entire canal, and therefore is two and one-half or three inches in length, and will accommodate three 50 mg. capsules. The radium is screened with one or two millimeters of platinum (=2 or 4 mm. lead) and 0.5 mm. of hard rubber or aluminum. It corresponds to the curve of a uterine sound, and when firmly grasped in a special forceps, it can be introduced like a sound. After the dilatation and curettement this is inserted under aseptic precautions and left in place 24 or 48 hours depending upon the conditions present. The vagina is well packed, both to keep the applicator in place and to displace the bladder and rectum as much as possible.

*In the larger size group of fibroids and in malignant disease we almost always use both radium and deep roentgentherapy.*

In our series of 297 cases, 152 were treated by x-rays alone; 88 were treated by radium and

x-rays combined; and 13 were treated by radium alone; while 44 cases were examined and either because of strong maternal desire, very large fibromyomata, calcified, degenerated or submucous fibroids, were referred for surgery. The small proportion of cases treated by radium alone in this series is due to the fact that the smaller sizes are commonly referred to gynecologists, and more commonly the larger size of those suspected of being malignant are referred to the radiologist.

The record of the cases treated in my private clinic is briefly as follows:

Cases of fibromyomata treated by irradiation .....	258
Roentgen therapy alone .....	152
Radium therapy .....	14
Radium and roentgentherapy combined ..	92

There were 47 cases in which irradiation was not considered the treatment of choice and surgical removal was advised.

Nine of the patients had had previous myomectomies performed, with later recurrence of their bleeding. Satisfactory results were obtained in these cases by irradiation.

Of the 258 patients treated by us, 21, or 8.1 per cent of them, were subsequently operated upon due to a persistence of the patients' symptoms. Ovarian cysts were probably the most frequent cause of a persistence of the symptoms. Large cystic, degenerating, or calcified fibroids were also found to be causes of a persistence of the symptoms, but some partially calcified fibroids were relieved of all subjective symptoms, and the fibroid reduced in size.

Of the 258 patients, 15, or 5.8 per cent, have died from genital malignancy. Twelve of these died from carcinoma of the uterus; 1 from sarcoma of the uterus; and 2 from carcinoma of the ovary. Of the 12 patients who died from carcinoma of the uterus, 7 died within 2 years and were probably malignant from the start, an error in diagnosis having been made. Five, or 1.9 per cent, developed carcinoma of the uterus in later years; three respectively of these latter five cases were treated by roentgentherapy alone, and two were treated by combined radium and roentgentherapy.

Thus, 8.1 per cent of the patients were subsequently operated upon, and 5.8 per cent of the patients later died of genital malignancy. Very gratifying results were obtained in 86.1 per cent

of the cases of fibromyoma treated by irradiation. There were 19, or 7.5 per cent of the patients in our series, who had passed the menopause before coming under our observation. Of these, one died 2 years later from carcinoma of the ovary, two died one and two years later from carcinomatosis of the abdomen, and one died from kidney disease 8 months after treatment was begun. We believe that these two cases were incorrectly diagnosed, and, therefore had insufficient treatment.

*Menstruation Following Treatment*, is apt to occur once, and at times twice. If near the menopause it is almost certain to be permanent. If the patient is young it may recur after a year or two, and a few pregnancies have developed, as recorded in literature, all with normal children.

Disappearance of the tumor following treatment may generally be expected. In 162 cases in which we have definite data it was found that the average reduction of the tumor was 50% of its original size in 3 months; 30 per cent in 6 months; and the majority of the tumors were not palpable at the end of a year. When calcifications are present, they do not change, but the surrounding tumor tissue is reduced.

Libido or sexual desire were found to be influenced slightly if at all by irradiation. At the time of treatment, particularly following introduction of radium, sexual relations were suspended due to vaginismus, leucorrhea, etc., but after several months when these symptoms have subsided relations apparently can be resumed by the patient with satisfaction. A group of 14 cases were analyzed in which it was possible to frankly discuss this subject without too much embarrassment to the patient. (It must be remembered that this report of 258 cases includes private cases only). Of these 14 cases, 9 reported no change in their sexual desire; 3 reported decreased desire and 2 reported increased desire. Hanks, reporting from the Mayo Clinic, calls attention to the fact that following roentgen castration, intercourse has been enjoyed to its fullest. There is a knowledge that all her organs are present. Such is not the case following hysterectomy. Gilbert and Eghiayan, by a comprehensive review of their own cases and those reported in the literature conclude that libido is less influenced in those cases in which the menopause has been induced by irradiation than those



in which it has been induced surgically. Bride, reports an alteration of the sexual desire in 39 per cent of his post-operative cases.

#### CANCER OF THE UTERUS TREATED BY IRRADIATION

Cancer of the uterus comprises about 30 per cent of all cancers. It is in great part a preventable disease, if we utilize all of the knowledge now available. It is believed by most investigators that cancer of the cervix, which forms about 90 per cent of the cancers of the uterus, follows persistent cervicitis. Therefore, if the cervicitis is properly and promptly treated, most cancers of the cervix will be prevented. The differentiation between endocervicitis and early cervical carcinoma can only be made by the microscopist. However, as will be shown later, the early diagnosis is the greatest single factor in the successful treatment of carcinoma of the uterus. *This early diagnosis can only be made regularly, and our percentage of cures greatly increased after we shall have educated every woman to consult her physician at once when there is any unusual discharge, even if not bloody, but especially if it is bloody.* Every woman over the age of 35, especially if she has borne children, should be examined digitally and visually by vagina and rectum twice a year. We can also recommend that at this visual examination the cervix and upper vagina be swabbed with a large cotton applicator saturated with Lugol's solution, as recommended by Schuller. If all parts stain a deep mahogany brown, one can eliminate the diagnosis of carcinoma of the cervix. If part of the cervix does not stain it does not make the diagnosis of carcinoma, but raises the suspicion which should lead to a microscopical examination and appropriate treatment according to the diagnosis.

As patients now see physicians, only 20 per cent of all cancers of the uterus come early enough to be considered operable. Eighty per cent, therefore, must without doubt depend upon irradiation for whatever good can be accomplished. Even with the 20 per cent in the operable stage that now reach the physicians, most leaders in this line of work agree that irradiation gives equally as good results, and I believe better results, if the irradiation is skillfully and thoroughly applied.

In the report from the Ministry of Health in London, published in 1927, Dr. Lane-Claypon published the statistics of 6,661 cases of cervical carcinoma operated upon by vaginal or abdominal hysterectomy, and found 2,227 were alive at the end of five years, making only 34.1 per cent. On the other hand, she found 1,117 "operable" cases which were treated by irradiation, and 400 were alive at the end of five years, which is 35.8 per cent. Counting all cases, however, that presented themselves to the surgical clinic, operable and inoperable, she found that 18.3 per cent were alive at the end of five years, while irradiation in a similar group gave 22 per cent of five year results. According to these general (London) statistics, therefore, the radiologic treatment showed slightly better results in the same class of cases, even though the radiological treatment was at that time in the developmental stage, and of course operative mortality (17 per cent—Heyman) was avoided.

Heyman, reported in 1927, from the Radium-hemmet on 145 "operable" and "borderline" cases in which they obtained 46.2 per cent of five year cures. The percentage of cures, counting all cases, showed a progressive increase as technique was improved; 1920 equals 10 per cent; 1921 equals 17 per cent; 1922 and 1923 equals 36 per cent. For stage I, equals 86 per cent; for stage II, equals 42 per cent; and for stage III, equals 30 per cent. I am sure that future statistics will show even better results because of improved technique and better education of the public.

Recently, Voltz, (Strahlenbehandlung der Weiblichen Genitalcarcinoma, 1930) has reviewed 5,246 cases of carcinoma of the cervix treated by irradiation, and collected from the literature. Omitting fractions, these showed that only 20 per cent were operable or borderline cases, (confined to the cervix or only beginning to encroach upon the vagina, and freely movable) leaving 80 per cent in which irradiation is the only method that offers hope of cure or relief, due to lack of knowledge and alertness on the part of both the public and the profession. Of this total number, and counting all cases seen, only 17 per cent showed five year recoveries; but in the group classed as "operable" and treated by irradiation there were 43 per cent recoveries. This is a higher percentage than is obtained by the average from surgical reports. In the special



radiological clinics, where the most efficient technique is carried out even better results are obtained.

TABLE I

CARCINOMA OF THE CERVIX TREATED BY IRRADIATION—  
PERCENTAGE OF CURES OF ALL CASES APPLYING  
FOR TREATMENT

Strahlenbehandlung der Weiblichen Genitalcarcinome—VOLTZ—1930 Cases Collected from World Literature	
A. Doderlein .....	18.2%
E. Bumm .....	17.7%
Kehrer .....	27.9%
Kronig-Opitz .....	7.9%
Seitz-Wintz .....	18.9%
Menge .....	25.1%
Forsell .....	23.3%
Regaud .....	16.6%
Baisch .....	16.6%
Ward und Farrar .....	22.4%
Healy .....	9.0%
Beuttner .....	15.9%
Schmitz .....	14.5%
P. Zweifel .....	8.2%
Clark und Block .....	10.4%
Schauta (Adler) .....	24.0%
Mühlmann .....	16.1%
Winter .....	8.3%
Henckel .....	16.1%
Strassmann .....	13.7%

Total Cases 5,246 — Five Year Cures 913 = 17.4%

TABLE II

CARCINOMA OF THE CERVIX  
"OPERABLE" CASES TREATED BY IRRADIATION  
Strahlenbehandlung der Weiblichen  
Genitalcarcinome—VOLTZ—1930  
Collected from World Literature

A. Doderlein .....	37.0%
E. Bumm .....	28.3%
Kehrer .....	40.7%
Seitz und Wintz .....	57.4%
Menge .....	55.6%
Forsell .....	46.2%
Regaud .....	25.8%
Baisch .....	23.8%
Ward und Farrar .....	50.0%
Healy .....	23.5%
Beuttner .....	47.0%
Schmitz .....	50.0%
P. Zweifel .....	25.0%
Clark und Block .....	27.3%
Henckel .....	34.7%
Strassmann .....	32.0%

1039 Operable and Borderline Cases=19.8%—

Cured 444=42.7%

4207 Inoperable and Incurable Cases=80.2%—

Cured 469=11.1%

5246 Total Cases Treated

Cured 913=17.4%

TABLE III

CARCINOMA OF THE CERVIX TREATED BY IRRADIATION IN THE RADIUM INSTITUTE, PARIS  
Under Prof. Regaud,—Lacassagne, Brit. Med. J., Nov. 19, 1932

Years	Total Treated	Stage I		Stage II		Stage III		Stage IV	
		Irradiated	Cured	Irradiated	Cured	Irradiated	Cured	Irradiated	Cured
1919 to 1923	271	30	33%	104	26%	111	8%	26	0%
Radium only was used in this group of cases—Vagina + Uterus									
1923 to 1926	317	22	86%	96	42%	152	30%	47	2%
Radium in the Vagina and Uterus + External Irradiation									
1919	83	Cured	= 10%	Radium to Cervix					
1920	89	"	= 15%	"	"	"			
1921	36	"	= 19%	"	"	"	and in Uterine Canal		
1922	63	"	= 26%	"	"	"	"	"	"
1923	74	"	= 31%	"	"	"	"	"	"
1924	68	"	= 35%	"	"	"	"	"	"
1925	88	"	= 32%	"	"	"	"	"	"
1926	87	"	= 35%	"	"	"	"	"	"
Total	588 — 154	= 26%							

AN ANALYSIS OF THE ABOVE CASES LIMITED TO THOSE TREATED IN 1926 SHOWS THE FOLLOWING 5 YEAR CURES.

	Patients Treated	Percentage Each Stage	Cured End 5 Years	Percentage 5-Yr. Cures
Stage 1 .....	4	4%	4	100%
Stage 2 .....	27	31%	15	56%
Stage 3 .....	41	47%	12	29%
Stage 4 .....	16	18%	0%	0%
Total .....	88	100%	31%	Av. 35%

#### PALLIATIVE RESULTS IN THE IRRADIATION TREATMENT OF CARCINOMA OF THE CERVIX

In the treatment of cancer of the cervix by irradiation, we must not only consider the curative value, which is about 25 per cent of all cases, but we must take into account the palliative value of advanced cases until we can get all patients to come for treatment while in the early stage, when the curability with our best management will run from 50 to 80 per cent. Heyman, in reviewing 1,237 cases treated at the Radiumhemmet from 1914 to 1926, shows 90 per cent were relieved from bleeding for shorter or longer periods; cessation of offensive discharge was obtained in 50 per cent; while close to 50 per cent were relieved of their pain, and about 60 per cent were able to return for a shorter or longer period to their usual occupations.

#### TECHNIQUE IN THE IRRADIATION TREATMENT OF CARCINOMA OF THE CERVIX

Only when cancer grows according to some standard, can a standard of technique be established. Cancer is notoriously irregular in its behavior, and will invade any tissue. Our object in cancer treatment is (1) to destroy every cell, and especially to destroy every new cancer cell as it forms, and (2) to do this without permanent serious damage to the normal tissue cells. Fortunately, normal tissue is somewhat more resistant to irradiation than is the cancer tissue. By prolonging the action of the irradiation so as to effect all cancer cells during the process of division, and yet keep the treatment within the period of radio-sensitivity of the cancer cells (about 3 weeks) we obtain the best results. We get the greatest differentiation upon the cancer tissue as compared with the normal by the use of highly filtered radium—one to two millimeters of platinum, which equals from two to four millimeters of lead. It is my practice to use two millimeters of platinum and one millimeter of rubber for intra-uterine applications. I usually use 150 milligrams of radium for a period of 36 to 48 hours, depending upon the extent of the disease, and the opportunities for the associated high voltage x-ray therapy. I make use of the special uterine applicator designed by me on the principle of a uterine sound which distributes the irradiation throughout the uterine canal, and throughout the pelvis. Patients do not die from

the local disease, but from the extensions up along the ureters and outward into the pelvis.

The local applications about the cervix must be adapted to the location and extent of the disease. One must always protect, so far as possible, the normal tissues, especially the rectum and bladder. Even for these local effects I use two millimeters of platinum filtration, and from 10 to 20 millimeters of rubber.

The associated necessary high voltage x-ray treatment must also be adapted to the location and the extent of the disease. When a limited amount of radium must be used one can in part compensate by using two millimeters of copper filtration with the high voltage x-rays, and thus increasing the external irradiation effect. The x-rays should cross-fire upon the disease, but one must take into account the cross-fire effect upon the subcutaneous tissue or a fat necrosis may result. Time and space will not permit a detailed discussion of the technique.

#### CARCINOMA OF THE BODY OF THE UTERUS TREATED BY IRRADIATION

The diagnosis of carcinoma of the body of the uterus must be considered, especially after the age of 35 years, whenever the cervix is healthy and there is inter-menstrual bleeding. If bleeding or spotting occurs after the menopause, carcinoma must be diagnosed until proven otherwise. The definite diagnosis can only be made by microscopical examination after dilatation and curettement. Since the intermenstrual bleeding at, near, or after the menopause is definitely abnormal, and since the application of radium in the uterine canal will cure nearly all cases, even if not malignant it is my practice to insert 150 milligrams of radium in 2 millimeters of platinum for 24 hours at the time of the curettement so as to make one operation. If malignancy is present it is the very best procedure, and much better than to wait for a report and then make the insertion. Within this 24 hour period a definite microscopical examination can be made. If no malignancy is found, no harm will be done, and in nearly all cases it will cure the patient. If malignancy is found the radium is left in place 48 hours.

When the diagnosis can be made while the carcinoma is still confined to the uterus the patient could be cured by operation in about 50% of the cases and until recently operation was ad-

vised in such cases. Now, when and where expert radiological service is available, in which both radium and high voltage x-rays are used, a higher percentage of cures can be obtained by irradiation and with less risks, than if treated by surgery.

TABLE IV  
THE TREATMENT OF CORPUS CARCINOMA BY  
IRRADIATION

Cases Collected from World Literature			
Strahlenbehandlung der Weiblichen Genitalcarcinome—VOLTZ—1930 Chapter XII, P. 120			
"Operable Cases"	198	Cured	= 56.5%
All Cases Treated	362	Cured	= 35.6%
Doderlein Clinic — All Cases Cured			= 40.9%
Doderlein Clinic — Operable Cured			= 66.0%

TABLE V  
CARCINOMA OF THE BODY OF THE UTERUS  
Freidrich Voltz-Universitas Franenklirik, Munchen  
Strahlentherapie, 44—1932

Total cases treated 1913 to 1924	= 88	= 100 %
Cured 5 years after treatment	= 36	= 40.9%
Total Cases Treated 1913 to 1927	= 107	= 100 %
Cured 5 years after treatment	= 49	= 45.8%
With improved technique 1921 to 1927	= 39	= 100 %
With improved technique cured	= 24	= 62 %

TABLE VI  
THE IRRADIATION TREATMENT OF CORPUS CARCINOMA  
Showing the Advantage of Combining Radium and  
X-rays  
Friedrich Voltz: Strahlentherapie 44:1932

1—Treated with Radium 43—Healed 12	= 27.9%
2—Treated only with Roentgen Rays 3— Healed 1	= 33.0%
3—Combined Radium and X-rays 61— Healing 36	= 59.0%
1913 to 1926—Total 107—Healed 49	= 45.8%

These tables show that with modern technique the results are at least equal or superior to hysterectomy, with the eliminations of nearly all operative mortality risks. Table VI especially shows the importance of combining the radium and high voltage x-rays in the treatment of carcinoma of the body of the uterus,—more than doubling the results from radium alone.

#### SUMMARY AND CONCLUSIONS

For the sake of brevity this discussion is limited to uterine fibroids and uterine carcinoma. The opinions are based upon a review of some of the most reliable records in literature, as well

as my own experience, from which I believe we may draw the following conclusions:

1—Small fibroids up to midway between the symphysis and the umbilicus are preferably treated by irradiation.

2—If the tumor is very large, or mechanical pressure is serious, operation should be performed.

3—It is often advantageous to combine the insertion of radium with the application of high voltage x-rays.

4—Carcinoma of the cervix is usually secondary to a cervicitis, which if properly treated will prevent carcinoma.

5—Carcinoma of the cervix is best treated by irradiation.

6—With thorough modern technique in the early cases from 60 to 100 per cent would be cured; while at present, because of the late stages, only 17 per cent of all cases are being cured.

7—With modern technique, 62 per cent of five year cures have been obtained by irradiation treatment of carcinoma of the body of the uterus.

#### X-RAY DIAGNOSIS OF EARLY MITRAL DISEASE\*

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Early in the present century, it was not believed that the usefulness of the Roentgen ray would ever pass beyond the domain of surgery. It was generally known that the x-ray would prove the existence of a fracture, or demonstrate the presence of a bone lesion, or locate a metallic foreign body, but many still doubted the usefulness of the x-ray in the study of internal organs. As time went on, there was improvement in x-ray equipment, which in turn afforded a greatly improved technique. With more rapid exposures and a better quality ray, the early roentgenologists were then able to go ahead with exploration of the internal organs, one after the other in rather rapid succession, with a very great deal of satisfaction to themselves as well as to the internist. The stomach, the lungs, the kidneys, and the gall-bladder were all studied, with considerable aid to the clinician,

\* Read before the Medical Society of Delaware, Lewes, September 28, 1932.



long before the cardiovascular system was considered. As a matter of fact, it has only been within the past ten years that much attention has been paid to the possibility of x-ray in the field of cardiology.

A roentgenologist of one of our large eastern hospitals told me only recently that when the cardiologic department of their hospital began sending him patients with cardiac disease to be x-rayed for diagnosis, he simply laughed and said to his staff, "What can I tell about a heart on an x-ray film?" But he also said that after a little study and investigation he found that considerable information could be gained from the changes in cardiac outline as projected on the x-ray film.

Probably the first paper in English, or at least in this country, on the value of x-ray in examination of the heart was written by Williams, of Boston, and read before the American Association of Physicians, in April, 1896. Following this paper was one written by Pfahler, of Philadelphia, on the diagnosis of aneurysm and its differentiation from the tortuous aorta, in 1903. Baejter, of Baltimore, classified the different types of aneurysms in 1906. Owen and Fenton were the first to report a case of extreme dilation of the left auricle, proven by autopsy in 1901.

Some years later important contributions to the study of the heart were made by C. R. Bardeen, Professor of Anatomy at the University of Wisconsin, who published a very valuable method of measuring the cardiac outline; and J. G. Vanzwalwenburg, late Professor of Roentgenology at the University of Michigan, who described a method for measuring the relative size of the auricles and ventricles.

Still more recent workers are Steel, of Cleveland, who has probably done more than anyone else to clarify the roentgen findings in hearts with mitral valve disease; Rigler, of the University of Minnesota, who believes that the oesophagus should be filled with barium in order to demonstrate cardiac deformity. This is probably true only in the exceptional case, but for ordinary routine examinations I do not believe this elaborate method is necessary.

In studying the shadow of the cardiac outline, as shown upon an x-ray film, one finds many normal variations in shape and size, but there are, broadly speaking, two main types of

hearts; the vertical heart, of the long narrow chest, and the more or less horizontal heart, of the short thick chest. Aside from these normal variations, there are many changes in the cardiac outline due to conditions outside the heart. For instance, the hypertensive heart with widening of the ventricles, simple hypertrophy of the right ventricle due to chronic obstructive pathology in the pulmonary circulation, and then the various changes due to the effects of lesions in the valves themselves. The mitral valve is the one most commonly affected, and I shall consider in this paper only the changes in cardiac outline resulting from disease of this valve; namely, mitral stenosis and mitral regurgitation.

Early mitral disease and early tuberculosis so often simulate each other clinically that it becomes most important to differentiate these two conditions at the earliest possible moment, in order to institute prompt and effective treatment. Many of these patients with early stenosis have cough, temperature, and even bloody expectoration, suggesting very strongly the presence of tuberculosis. In a case of this kind the x-ray, sometimes combined with a fluoroscopic examination, becomes an important determining factor in clearing up the diagnosis. The reason for the importance of an early diagnosis is that rest in bed is quite as necessary to heal an early active mitral lesion as it is to heal an early active tuberculosis. Hence the earlier the diagnosis is established the better chance the patient has of ultimate recovery.

#### X-RAY ANATOMY OF THE HEART

Before we can hope to intelligently interpret the many changes in the morphology of the heart caused by disease which attacks the valves we must familiarize ourselves with the normal anatomy of the heart as seen in the living human being.

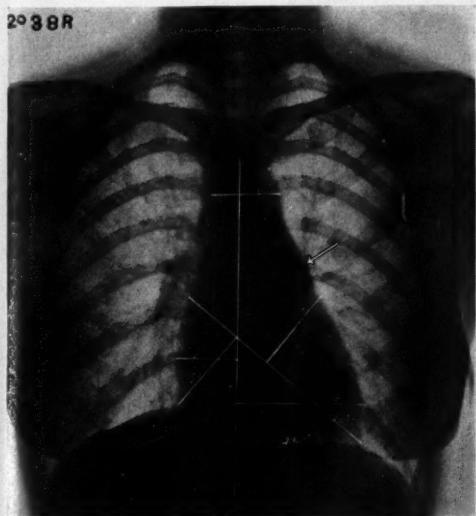
The normal heart, as we all know, is composed of four chambers; two auricles and two ventricles. The normal location of these chambers and the normal relation of one to the other is the important thing we must keep in mind if we hope to differentiate the normal from the pathologic heart. When the patient is facing the examiner, the normal cardiac outline presents on the right border, from above downward, two main curves or arcs. The superior arc is composed of the superior vena cava and ascending



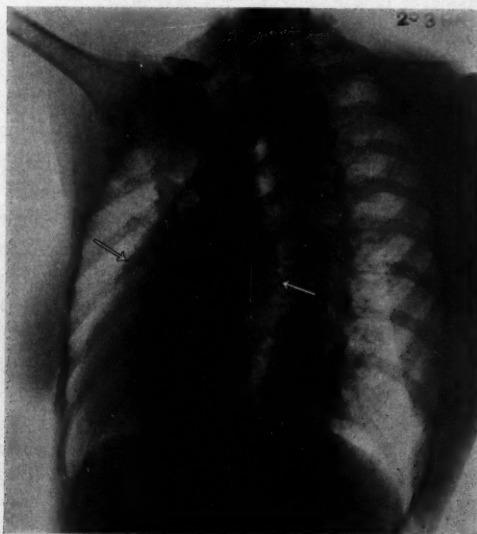
A case of advanced mitral disease. Note the marked enlargement of the conus of the right ventricle in the left mid arc; also the hypertrophy of both the right and left ventricle. This represents mitral stenosis with regurgitation.



Another case of mitral stenosis with regurgitation. Note that there is no enlargement of the conus in the left mid arc but the left auricle has enlarged and been displaced to the right. Note the thin wall of the left auricle on the right border of the heart.



Anteroposterior view. Note that there is no bulging in the left mid arc, simply a straightening out of the left border which is always significant of mitral stenosis.



Same as number 3, taken in the right antero-oblique position. Note the enlarged left auricle filling in the retro cardiac space which is not visible in the anteroposterior view. Also note the enlarged conus, anteriorly. This shows the importance of the oblique view in the case of mitral stenosis with minimal change in the cardiac shape.

aorta, and the lower arc is the border of the right auricle. The left border presents from above downward, three arcs. The superior arc is composed of the aortic knob, where the arch of the aorta makes the turn to become the descending aorta. The mid arc (this is the important one from the mitral standpoint) contains the pulmonary artery, conus pulmonalis, and the appendage of the left auricle, but not the main cavity of the left auricle. The lower arc is composed of the left ventricle. You will note from the above description, that the right ventricle does not enter into the cardiac borders in the antero-posterior view, nor does the left auricle. The right ventricle is entirely anterior, and the left auricle is entirely posterior.

These two chambers control, or support, the lesser or pulmonary circulation, the left auricle, with its thin, easily dilatable walls, receiving the blood from the lungs through the four pulmonary veins, and the right ventricle, with its thick muscular walls propelling the blood back to the lungs through the pulmonary artery. It follows then that a stenosis or obstruction in the mitral valve would throw a strain upon this part of the heart first, and consequently changes in the contour of these two cavities would occur long before changes in the right auricle and left ventricle, which have to do with the systemic circulation. Reasoning further, if the mitral valve is stenosed, one would expect the first effect of back pressure to be in the left auricle, causing hypertrophy and dilatation; secondly, secondary stasis in the lungs, with its consequent back pressure effect on the right ventricle, and that is just what happens. The earliest changes take place either in the left mid arc as a bulge caused by the enlargement of the conus of the right ventricle, or in the middle third of the retro-cardiac space in the oblique view, due to enlarged left auricle. In the vast majority of cases both these deformities occur to a greater or lesser extent.

Sometimes there is little or no enlargement of the conus, with considerable enlargement of the left auricle; on the other hand, in some cases we find considerable enlargement in the left mid arc. Sometimes an actual bulge in the left mid arc is not present, but simply a straightening out of the left border. In these cases the oblique view becomes most important. As a matter of fact, we are now of the opinion that an antero-

posterior view and oblique view are both necessary to show the earliest changes in mitral disease. The particular oblique view which we believe shows this best is the right oblique at an angle of 50°. The cause of this bulge, or a filling in of the left mid arc, is a subject of some dispute at the present time. Many workers claim it is due to hypertrophy and dilatation of the left auricle, pushing the pulmonary artery and the left auricular appendage in front of it.

Assman, after a great deal of work along this line, seems to think that it is due to hypertrophy of the right ventricle with a consequent rotation of the heart to the left, causing the pulmonary artery to come into better relief.

Robinson has shown, in some cases which have come as autopsy, that this bulge is due to dilatation of the conus pulmonatis.

Steel, who carefully examined one hundred cases of mitral disease, clinically, roentgenographically, and pathologically, says: "In the presence of a mitral lesion the left auricle readily undergoes hypertrophy and dilatation. Enlargement of this chamber has been a constant finding in all the cases observed. The left auricle, with its tributaries, will accommodate a large volume of blood, and this, with an additional amount of blood in the lesser circulation, as a result of pulmonary stasis, readily explains hypertrophy of the right ventricle.

According to MacCallum and McClure, there is an actual increase in blood pressure within the pulmonary arteries and the left auricle. Mackenzie attributes the right-sided hypertrophy to myocardial weakness.

It matters little, from a practical standpoint, which of these theories is correct. The important thing is to recognize the particular cardiac deformity and interpret its meaning. My own impression is that there is a concurrent hypertrophy of the left auricle and right ventricle, the hypertrophy of the left auricle, being due to the immediate effect of the obstructing mitral stenosis with its consequent back pressure in the left auricle, and the pulmonary veins, and the hypertrophy of the conus of the right ventricle, resulting from venous stasis in the pulmonary circulation.

When regurgitation begins, then, the typical cardiac shadow of true mitral stenosis ceases to exist. Instead of the bulge in the left mid arc, the ventricles, which have been undergoing hy-



pertrophy, straighten out this border, thus causing the bulge to be not so prominent, or disappears altogether, not because the enlargement is not still present but because the ventricles, by enlarging, have extended out to meet it. The apex becomes much more rounded and the entire heart becomes globular in shape, and the pulsations of the right ventricle can be seen at the right cardio-phrenic angle. Of course, as you all know, after regurgitation has begun, with its accompanying hypertrophy of the ventricles, the prognosis becomes much more serious. Sir Thomas Lewis, of London, said some years ago that the most serious thing that can happen to a heart is ventricular hypertrophy. Such a simple, homely statement as this has probably not taken root in the thoughts of the medical profession as it should, because of its generalization. But its importance should not be overlooked in formulating a prognosis.

#### SUMMARY OF 100 CASES

In a rather cursory analysis of one hundred of our own private cases taken consecutively, we found the following interesting facts:

There were 58 females and 42 males.

Dividing these same cases into age groups by decades, we find that up to the age of ten there were two males and two females. Of these four, three had pure mitral stenosis, one had mitral stenosis with regurgitation.

In the group between ten and twenty, there were eight males and eleven females. Fifteen of these had pure mitral stenosis and four had stenosis with regurgitation.

In the age group between twenty and thirty, there were six males and sixteen females. Of these eighteen had pure mitral stenosis, and four had mitral stenosis with regurgitation.

In the group between thirty and forty there were seven males and thirteen females. Eight of these had pure mitral stenosis, and twelve had stenosis with regurgitation. You will notice that it is in this age group that regurgitation is present in a larger number than a pure mitral stenosis.

Between the age of forty and fifty, there were twelve males and eleven females, fourteen had mitral stenosis, and nine had stenosis with regurgitation.

In the fifty to sixty age group there were four males and five females, four with stenosis, and five with regurgitation.

In the sixty to seventy age group there were four males, three with mitral stenosis, and one with mitral stenosis with regurgitation.

Above seventy there was one with mitral stenosis with regurgitation.

You will note from this analysis by the age group, that the preponderant lesion found up to thirty years of age was stenosis, giving a total up to the age of thirty of thirty-six patients with mitral stenosis, against nine with stenosis and regurgitation.

Whereas, in the age group of thirty to fifty there are twenty-two with stenosis, and twenty-one with stenosis and regurgitation. In other words, up to thirty years of age, mitral regurgitation had occurred in only twenty-five per cent of the total number of patients having mitral valve disease; the other seventy-five per cent were pure mitral stenosis. On the other hand, in the group between 30 to 50 years of age mitral regurgitation accounted for fifty per cent of the total number.

Further, we found that about twenty-five per cent of them complained of precordial pain and distress, most of whom were among the group having regurgitation superimposed upon stenosis.

Digestive symptoms were the predominant symptoms in only about ten per cent of the cases.

Dyspnea, while walking on the level, was the outstanding symptom in twenty per cent of the cases, with ten per cent complaining of nervousness as the chief complaint. Twenty-five per cent had a temperature above ninety-nine and a half.

Many of these patients in the age group between thirty and fifty could trace their attacks of rheumatism or other causative factors back before the age of fifteen, showing that the initial lesion was in existence many years before the patient had been attracted to the fact that they had sufficient trouble with the heart to consult a physician.

In about eighty per cent of this series of one hundred cases we were able to make a diagnosis of mitral disease by the x-ray film alone. In about ten per cent of the cases it furnished corroborative evidence, and in another ten per cent there was not sufficient change in the cardiac outline to warrant a diagnosis, although clinically it was rather evident that mitral disease did exist.

DR. G. W. K. FORREST (Wilmington): I do not want to talk long, for time is getting short, but I do want to publicly express my appreciation to Dr. Allen for the privilege he has extended to me on several occasions of seeing with him quite a few of these cases. It is undoubtedly a great aid to a physician in making a diagnosis in these early heart cases.

I have had several in private practice in which I had doubt, although the histories in these cases are so indefinite, but sometimes we get a definite history of rheumatism, etc., in early life; sometimes a history growing pains and things of that kind; sometimes malarial attacks. When we have those things we feel that the x-ray aids us very much, particularly when we do not have any definite heart murmur. However, as I said, I mainly stand on my feet to express my appreciation to Dr. Allen for having helped me out in several of my private cases.

PRESIDENT HOCKER: Any further discussion on Dr. Allen's paper?

DR. PETER W. TOMLINSON (Wilmington): I see we have Dr. Cleaver here. He has had a good deal of experience in x-ray work. I wonder whether he endorses all that we have heard from Dr. Allen. We would be glad to hear from Dr. Cleaver. It is a very interesting paper.

PRESIDENT HOCKER: Dr. Cleaver, may we hear from you?

DR. H. A. CLEAVER: I am very much obliged to Dr. Tomlinson, but really I am totally unprepared to carry on any discussion whatever. I didn't come expecting to do that; I just came to listen.

I would like it, however, if Dr. Allen would give us some discussion on the fluoroscope in the right and left oblique positions, and also if he will evaluate for us what is talked of so much in the wave up the left border of the heart. I am sorry I am not prepared to discuss the paper.

PRESIDENT HOCKER: Is there any further discussion on Dr. Allen's paper?

DR. TOMLINSON: Before Dr. Allen answers that I want to say further that I guess it is because my lunch sits a little heavily and I may have dropped off to sleep once, unintentionally, and when I woke up I thought he was still going on. It reminds me of the Pennsylvania Dutchman who came down to Philadelphia to get a wedding present. A friend of his was going to be married. He didn't know just what he

wanted. The salesman asked him what he wanted. He said, "I want you to help me out. I want to get a present for a friend of mine who is going to be married."

The salesman said, "What do you think of a nice clock?"

"Yes, that is the very thing."

"Well, how about an alarm?"

"Yes, something to get him up."

"All right. Here is a clock that will run eight days without winding."

"Well, heaven's sakes, how long will it run if you wind it up?" (Laughter).

PRESIDENT HOCKER: I am sorry, Dr. Tomlinson, we can't be responsible for your naps. If there is no other discussion, Dr. Allen, do you have anything to say in conclusion?

DR. ALLEN: Nothing, except I can answer partly what Dr. Cleaver just asked, that is, with reference to the pulsations of the left border of the heart. You hear a lot of these men talk about being able to differentiate under the fluoroscope the left ventricular pulsation, the silent area, the left auricular appendage, the conus pulmonalis, the pulmonary artery, and the aorta itself.

I have tried awfully hard to see some of these. The other fellow may see them—I am not doubting that at all—but I have never been able to. As a matter of fact, some of them claim that they can see a separate pulsation of the aorta and of the pulmonary artery. Now when you consider those two from an anatomical standpoint, I do not believe that is quite possible, because they are both wrapped up in the same fibrous band. The aorta and the pulmonary artery are both wrapped up together in the same fibrous band, and I think those two pulsate as one. That is all I could ever see under the fluoroscope.

Another thing, I have never been able to see this little auricular appendage pulsation they talk about. The only thing I can make out of the left side of the heart is that one can tell where the left ventricles leave off and the mid-arc begins. In other words, under the fluoroscope you get this kind of motion, a see-saw motion, and the fulcrum of that see-saw is here. (indicating).

The reason I say it is here is because there is no dent there, but on the right side we have a little indentation here which marks the begin-

ning of the right auricle, and it is usually just opposite that where you get this silent area in the left side, and that is where you get your see-saw motion there; in other words, a contraction of the left ventricle, and then this here, (indicating), I get all as one; I can't differentiate those three or four different places they talk about up there.

So here you get your see-saw motion, left ventricle, and above that these structures, including the aorta and the pulmonary artery, which are both bound down by the same fibrous band of tissue.

On this side we get a little feeble wave-like pulsation, which is the auricle. You don't get the propulsive type of pulsation like you get in the left side. If you get an enlargement of the right ventricle and it is pushed over to the right, then you can get your pulsation of your right ventricle, but normally you can't get that.

DR. CLEAVER: Might I ask you to explain one thing further? Sometimes, on the left border of the heart, there is a wave which starts at the apex and travels up the left border; sometimes you will see it travel a certain distance and then apparently cease, and then go after that; in fact at times it will cease entirely and will not go any farther. How far would you consider that?

DR. ALLEN: You mean as far as the interruption of the pulsation is concerned?

DR. CLEAVER: Ordinarily the left border has been compared to the shaking of a blanket that waves, passing up. What I mean is this: what value do you consider it to be where that wave only proceeds a certain distance and ceases, or carries an interruption and then passes on beyond that? Do you consider that of any value?

DR. ALLEN: From a diagnostic standpoint, Dr. Cleaver, no. As a matter of fact, you get this silent area here (indicating). I have never observed the fact that you get a beginning contraction here and wave-like going up here, because the left ventricle contracts all at one time, and it happens so quickly that all I get is this silent area here which marks, to me, the end of the left ventricle. That is higher or lower depending upon whether there is hypertrophy.

DR. CLEAVER: What I meant was, do you consider that of any value whatever in passing up the left border, because the contraction starts at the apex and goes up, and it does show that

wave-like effect. What I wanted to get was this: Is it of any value to you as a clinician whether that wave proceeds without interruption or whether it has interruption? Would you evaluate it at all?

DR. ALLEN: I have been recently looking over a lot of literature, Dr. Cleaver, and I have never seen that particular point brought up. I wouldn't be able to answer that from my own experience, because I have not observed that particular part. I have observed the contraction as a ventricle, and this one here, of course, as your second, or see-saw motion, as we call it there. I do not think it would have any value.

DR. CLEAVER: That is what I wanted to get at.

DR. ALLEN: The determination of this point here, your silent area, is important because if you get hypertrophy, that silent area is going to be higher than if you have no hypertrophy at all.

DR. CLEAVER: Would you regard an hypertrophied ventricle, or a thickened wall, or an infiltrated wall would display a greater degree of elasticity than one which was an aural wall? If it be infiltrated or be thickened or in any way weaker, naturally your wave is going to be of an inferior character, in fact maybe almost absent. That is what I wanted to know. I am interested.

DR. ALLEN: I don't know that I can answer that, Dr. Cleaver.

DR. CLEAVER: I cannot; I thought maybe you could.

DR. ALLEN: I do not think, from a diagnostic standpoint, the character of the pulsation has very much to do as the cardiac deformity. The cardiac deformity is the important thing from the standpoint of diagnosis.

DR. CLEAVER: There is no question about that.

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## *The President's Page*

To the members of the Medical Society of Delaware:

In the last two issues I have referred to the proposed new Medical Act, and have told you I would let you know its fate. The main features of this act are:

1. A five member Council, which Council would consist of two members of the Medical Society of Delaware, two members of the Homoeopathic Medical Society of Delaware, and the Chief Justice of the state.
2. A single seven member Examining Board, which Board would consist of three members of the Medical Society of Delaware, three members of the Homoeopathic Medical Society, and one osteopath, this division being made because it is exactly the ratio in which we now work. By that I mean the Homoeopathic Society has its examining board the same as we do, and this would be merely a consolidation of the two boards.
3. The same examination to be taken by all persons who wish to practice the healing art in this state.
4. The same qualifications as to preliminary education must be had by everyone, before taking the examination.
5. The strength of the present Act is retained in every detail and is added to by the foregoing.

What is the purpose of this new Act? It brings the healing art in this state up to a higher plane than in any other state in the United States. It protects the people of this state from the influx of all cults and other types of healers, who are not qualified to treat people for conditions coming under the head of sickness. Realizing this, two of these cults, the osteopaths and chiropractors, have fought it very strongly.

As you have been told before, the Act has been worked up and brought to a point as near perfection as possible, has been passed on by your House of Delegates unanimously, and then submitted to the House of Representatives. Here no action was forthcoming, and we began to look around to find out the cause. It was in our own ranks.

The new Act will take some authority away from certain of our members, and they immediately began to undermine it. They did not attend the meetings when the Act was discussed, but waited until it was about finished before objecting. They made the statement that the members of the House of Delegates were not a representative body of men of our Society. It is to be regretted that these men hold themselves so far above their fellow physicians. All of this could be overlooked, however, if they confined their comments to our own Society. When several of us went before the committee in Dover to talk for the bill, we were confronted with the statement that four of our own members had already been down there and had asked them not to allow it out of committee. Without this interference we could have overcome the other objections and had the bill passed, but as the legislators felt we were not united ourselves, they would not listen to us.

What have these few selfish individuals done? They have left the way open for any type of cult to go before our legislature and have a bill passed giving them a right to practice anything. This is the feeling now among our legislators, and it will be more so next time. We have failed to protect the people of this state and those men who are going to put in the time to study legitimate medicine.

Gentlemen, I am sorry we failed but it was by our own hand.

Before you get this issue of the Journal, our picnic at the State Hospital will be over. I sincerely hope you will all have been able to come and enjoy yourselves, and that I will have had the pleasure of seeing you there.

Likewise you have all seen in the papers of my allowing my name to be used by the Democratic party as a candidate for Mayor of the City of Wilmington. I can only promise you that if I am successful I will so conduct the office that it will bring dignity and favorable comment to the profession. You all may say: What has a Doctor to do in politics? My answer is: It is a citizen's duty to do anything for his community within his power. I am a physician primarily, and can promise you also that I shall remain such and that I will not neglect my profession in any way.

Sincerely,

W. H. SPEER, M. D.

# EDITORIAL

## DELAWARE STATE MEDICAL JOURNAL

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VOL. V.

MAY, 1933

No. 5

We are now approaching the season of open houses and closed schools, which means more children in the streets, which means inevitably more children injured by automobiles, which in turn means more work for the doctor of the kind he prefers not to have to do.

How can the rising morbidity and mortality among children—and adults—from this cause be minimized? Certainly not through mere enforcement of speed or traffic laws; not through campaigns of wholesale arrests; but it can be done, we believe, by a persistent campaign of education which should reach pedestrian and driver alike. That this method works is attested by the experience of Pittsburgh, which tied with Evanston, Illinois, in winning the safety honors in the national safety contest for 1932.

We quote a dispatch summarizing the Pittsburgh experience:

PITTSBURGH, March 28.—Pittsburgh, one of the two "safest cities" in the United States, has no speed laws.

Down any one of the city's 11 "through boulevards" one may travel five miles in five minutes if one's car will go that fast.

In the rest of the city it is so dangerous to go fast that the temptation is dulled. Pittsburgh has possibly the most involved street system in the country.

Nestled in the valley junction of three rivers, spreading over surrounding hills in a maze of streets, which provide thoroughfares for 1,500,000 people, Pittsburgh and its suburban areas appear to offer more opportunities for fatal accidents than most American cities.

Yet the National Safety Council today is awarding to Pittsburgh a bronze plaque bearing the "safest city" title, the award being shared with Evanston, Ill., which tied for first place with Pittsburgh among 442 cities competing in the 1932 national safety contest.

Why is Pittsburgh a "safest city?"

Lewis W. McIntyre, city traffic engineer, former professor of civil engineering at the University of Pittsburgh, has the answer. In fact he shaped the circumstances that furnished the answer.

"Pittsburgh was the first city I know of to apply engineering principles to traffic regulation," McIntyre says. "In 1925 the city established the office of traffic engineer, centralizing a responsibility customarily shared by two or three different agencies of city government."

"The topography of Pittsburgh and the nature of its traffic offered an unusual problem. The population of Pittsburgh is 670,000, but its streets draw traffic from an area containing 1,500,000 people. Our 1932 appropriation for traffic regulation was \$150,000, out of which came expenses for new equipment, maintenance and repair of all traffic signals.

"We began with a two-fold program of control and education. First was a system of 'sharpshooting' with the police department. Instead of sending policemen out with blanket instructions to enforce the motor laws we made it compulsory for every motorist involved in an accident to report it to the police, 'spotted' the accident frequency on office maps compiled from the reports, and with systematically directed effect eliminated the causes for accidents where they were most frequent.

"Our educational program is based on the theory that 85 per cent of motorists who commit traffic offenses do so through ignorance, the remaining 15 per cent being maliciously inclined to reckless driving.

"A 'vigilante' committee of 500 prominent citizens was created. They are provided with cards on which they report instances of reckless or careless driving, taking the number of the offending machine. Instead of arresting the offender, he is mailed a polite letter of warning.

"Through co-operation with the Police Department a thorough educational campaign is carried on in the schools. The newspapers of Pittsburgh have responded with valuable co-operation. The radio also has been utilized to educate drivers.

"There are no speed limits in Pittsburgh. Pennsylvania State laws could be enforced, but enforcement is the weakest point in our traffic system. A splendid system of arterial highways covers the en-

tire Pittsburgh and outlying areas, and drivers may travel as fast as they choose on them without fear of arrest.

"The results tell the story. Taking 1930 as a base year, Pittsburgh's total fatalities in 1932 decreased 23 per cent in comparison with 1930, although traffic increased 7.4 per cent. In the same bracket, child fatalities decreased 73½ per cent. Our records for the first two months of 1933 show an even greater proportional decrease."

What a wonderful record! We commend the Pittsburgh plan to the Wilmington authorities, confident that, given time and encouragement, they too can eliminate three-fourths of the automobile deaths in children. Can any effort be more worth-while than this?

#### EDITORIAL NOTES

##### DEAR DOCTOR:

THE JOURNAL and the Cooperative Medical Advertising Bureau of Chicago maintain a Service Department to answer inquiries from you about pharmaceuticals, surgical instruments and other manufactured products, such as soaps, clothing, automobiles, etc., which you may need in your home, office, sanitarium or hospital.

We invite and urge you to use this Service.

It is absolutely free to you.

The Cooperative Bureau is equipped with catalogues and price lists of manufacturers, and can supply you information by return mail.

Perhaps you want a certain kind of instrument which is not advertised in THE JOURNAL, and do not know where to secure it; or do not know where to obtain some automobile supplies you need. This Service Bureau will give you the information.

Whenever possible, the goods will be advertised in our pages, but if they are not, we urge you to ask THE JOURNAL about them, or write direct to the Cooperative Medical Advertising Bureau, 535 N. Dearborn St., Chicago, Illinois.

We want THE JOURNAL to serve you.

The first course of lectures given by the Delaware Academy of Medicine and by them designated the "Spring Post-Graduate Course," is making a splendid impression on the local profession, and, for an initial venture of this kind, is receiving a very encouraging attendance. The course consists of five lectures on diabetes and two lectures on the sympathetic nervous system, all of them presented by workers especially competent to speak on their respective subjects.

This excellent beginning augurs well for the future, and we have assurances that future courses will be offered that will interest each and every variety of practitioner. Wilmington (and Delaware) is slowly but surely being put on the medical map.

The Board of Directors of the New Castle County Medical Society have suggested to their Committee on Medical Economics that an effort be made to have the Wilmington City Council repeal or reduce the annual license fee of ten dollars for physicians. This is a worth-while suggestion, and the committee will do all they can in this matter. In view of the excessive bur-

den of charity work which the profession is now carrying it is not at all unreasonable to ask for the repeal of this tax.

We are in receipt of a much appreciated letter from our good friend, Dr. A. C. Morgan, of Philadelphia, commending our March issue. He rejoices at the Ghadiali conviction, and would like to see the court record on file at the A. M. A. in Chicago and also at Harrisburg. Ghadiali left Philadelphia just as the profession learned he was on hand with his lectures.

Also, he says "publication of the minutes of the first meeting of the Medical Society of Delaware is of great historic value. It would be interesting to secure the family tree record of some of the present medical generation in Delaware, who can trace their splendid heritage back to previous members of your State Society. It would be found that history does repeat itself." Splendid, men—step right up with the genealogies.

The layman's credulity of alleged medical yarns grows apace; there is no depression in this respect, but there is a new deal, or at least a new yarn. Have you heard the recent and popular one about the octopus egg? It seems a lady, eating oysters last fall, swallowed what seemed to be a small pearl. After a few weeks her abdomen enlarged gradually, accompanied by sundry and serious pains. Finally, the inevitable surgeon discovered that the pearl had been an egg which had grown into an octopus, whose tentacles covered most of her intestines and other innards, to such an extent that its removal could be accomplished only in part; in fact, she can never be fully well again. Now you tell one.

## DELAWARE PHARMACEUTICAL SOCIETY

### The Relationship of Pharmacy to Public Health

The deposition of Dr. Virgil E. Simpson, in a case in Court of the Kentucky Board of Pharmacy, has an interesting bearing on the relationship of pharmacy in public health. He stated that pharmacy was one of the learned professions, a very essential part of the practice of medicine. He stressed the importance of the pharmacist's training and education in the prep-



aration of medicines for properly exhibiting a drug, so that the physician may obtain the desired results and safeguard the patient, and that his service protects the public from the dangers of unwise use of drugs.

Dr. Robert P. Fischelis, on the occasion of the award of certificates to registrants in New Jersey, said: "When an individual becomes a member of a profession, he ceases to be an individual as far as his public acts are concerned. He becomes a member of a class which is judged by the experience of the public with that class."

In addressing New Jersey Board of Pharmacy registrants, to whom Governor A. Harry Moore presented certificates, Dr. Robert L. Swain emphasized the relation of pharmacy to public health in these words: "Pharmacy must be seen as a service, as a public function, as an essential public health agency, as one making an unending contribution to the public welfare."

The Committee on the Costs of Medical Care urged in Recommendation 5 that pharmaceutical education place more stress on the pharmacists' responsibilities and opportunities for public service.

Dean Frederick J. Wulling in addressing the Lyon-Lincoln Counties (Minnesota) Medical Association said: "Physicians and pharmacists exist not for themselves but for the public welfare, and their aims and aspirations are all directed unselfishly and altruistically toward that end. These facts must be kept clearly in mind before they assure the realization, which not all physicians have as yet, of the necessity of much united and concerted work toward public health. The two professions should co-operate more willingly and effectively. They already do in a very respectable measure, but the co-operation should become much more general for the best results."

A resolution now before the Council of the American Pharmaceutical Association speaks of the responsibilities of pharmacy in relation to public health in the quoted paragraph, and also for the watchfulness of pharmacists in matters that affect the public. The action was responsive to proposed legislation in which it was suggested that alcoholic malt beverages might be distributed through drug stores.

"Whereas, the distribution of alcoholic malt beverages in drug stores would be most inappropriate because it would be contrary to the es-

sential purpose and important responsibilities of pharmacy in relation to the people and to public health, and because, through such distribution, an activity foreign to its purposes and ethics would be introduced."

—JOUR. AMER. PHARM. ASS'N.

## WOMAN'S AUXILIARY

### American Medical Association

President—Mrs. James F. Percy,  
Los Angeles, California

President-Elect—Mrs. James Blake,  
Hopkins, Minnesota  
National Convention,  
Milwaukee, June 12-16, 1933

### CONVENTIONS AND EARTHQUAKES

In the style of O. Henry's "Cabbages and Kings," we feel the above is a most fitting title for this message, written jointly in Los Angeles on March 14 by your convention chairman, Mrs. Rock Sleyster, of Wisconsin, and your national president.

The privilege of being together so many miles away from the convention city and the incomparable good fortune to be able to converse instead of write, is not to be measured by words.

Tremors in the earth there may be, but as to the results of the convention committee's plans for our welfare and happiness at Milwaukee there need be none in the minds of any one. Mrs. Sleyster frankly says, "I shall promise nothing so spectacular as that which I have experienced out here," but follows quickly with "it will take more than the earthquake to hurry me away from sun-kissed Southern California, and its hospitality."

However, we will both confess to some degree of shattered nerves, although extremely fortunate in being well out of the range of damaged areas. Even before today, rebuilding has begun, and it is to the credit of mankind that he rebuilds quickly and better. In our nation, banking has been resumed throughout the land and from all major troubles it may truly be said, a finer sense of fellowship results. To this end, the efforts of the convention committee are especially directed toward making it possible for all members attending to have the opportunity of becoming better acquainted and enjoying to the fullest, whether at work or at play, the Milwaukee Convention in its completeness.

To each state president and officer, we earnestly urge that the National Auxiliary tentative program in this issue be passed on to county presidents requesting that it reach the individual members and calling attention also to the scenic wonders of Wisconsin in the early summer. The marvelous stimulating ozone from the Great Lakes, miles of virgin forests, thousands of smaller lakes, invite all who can, to take along the family car and see America first.

The committee on exhibits, Mrs. H. R. Miner, chairman, promises not only to have a real rivalry in her department at Milwaukee, but hopes that much may be taken to the "Century of Progress Fair" at Chicago where, through the efforts of the Woman's Auxiliary and the president of the Chicago Medical Society and Dr. Wm. A. Pusey, a gift of space 10x10 feet, which would bring a rental price in four figures, has been most generously arranged as a gift by Dr. E. J. Carey of Milwaukee, who is in charge of the Hall of Science where this space is. Here will be an information bureau for the wives of visiting physicians, with local members as attendants. This is another and very splendid illustration of "Reasons for an Auxiliary" and to the initiative and foresight of the enthusiastic members of the Woman's Auxiliary of the Chicago Medical Society goes the full credit.

Word from Wisconsin says it is hoped that five additional counties will become organized before June; and from the executive secretary, Miss Buellbach, the auxiliary handbooks have been distributed to all the county presidents as well as state officers. Great teamwork is being established between the two states, Wisconsin and Illinois, developing the convention for Milwaukee and fair exhibit at Chicago with the Wisconsin officers being guests of the Chicago Auxiliary at their April 5 meeting.

The plans of all of our earnest workers are still very much in the making and while they and we are planning for you, will you not plan at this time with us toward making your attendance at both these events, which are but one and one-half hour's ride apart, assured?

Since it is generally conceded that we are at the beginning of a new era, let us contribute in this, its first year, by our presence and our keen interest in bringing from our own store of experience that which will be of help, value and inspiration to others and in return, have the joy

of knowing that we have added immeasurably by our encouragement, support and our assistance to the supreme satisfaction which the resulting success will bring to those who have prepared this feast of reason and flow of soul for us, to say nothing of what our eyes will see, our ears hear and our memories carry away with us.

Your fellow-workers,

Mrs. James F. Percy, President.

Mrs. Rock Sleyster,

Convention Chairman.

#### MILWAUKEE INVITES YOU

From the Wisconsin Auxiliary Convention Committee comes this attractive introduction to Milwaukee, the "good and beautiful," whither our thoughts are turning for those days from June 12 to the 16th.

"You have all heard about Milwaukee—read about Milwaukee—and now in a few short months you will be visiting Milwaukee to attend the 1933 annual convention of the American Medical Association, Women's Auxiliary.

Your coming will be an event; committees are working hard to make this gathering a real success. Until the time that the secrets of the program are divulged, we are going to tell you something about the convention city.

Indian legend tells us that the name "Mahn-a-waukie" was the native guttural cry of an Indian brave uttered as he drew his bark canoe from the waters of the present site of the city. In the Ouisconsin (Wisconsin) language this name means "good and beautiful lands." In different dialects other Indians are known to have called this spot "Mahn-a-waukie Seepe" or "gathering place by the river."

Father Marquette and Louis Joliet are said to have stopped here on their way to the discovery of the Mississippi River. They marked the site of the city as Milwaukee Bay on their map. This map is now in the possession of a convent in Montreal.

La Salle and his party stopped in Milwaukee on their way south in 1679, and in that same year the name appears as Millioke in the records of the Jesuit relations.

It was in 1815 that Solomon Juneau, a young Frenchman, purchased a small trading post in this village, and it was through his efforts that the city was incorporated in 1846 with Juneau as the first mayor.

In this short period of time Milwaukee has grown to be the twelfth most populous city in the United States.

When you come to Milwaukee in June to attend the annual convention of the Woman's Auxiliary to the American Medical Association, you will find a store of pleasures awaiting you. First of all the program, as arranged by the local committees under the chairmanship of Mrs. Rock Sleyster, is completely arranged for your pleasure and entertainment; and secondly, the city of Milwaukee is such a friendly and hospitable metropolis that the combination will leave a pleasant impression upon your memory.

Milwaukee is situated on the western shore of Lake Michigan, the largest fresh water lake in the country. Its beautiful harbor is the deepest and one of the largest on the Great Lakes. Through the city three navigable rivers wind their ways into the heart of the down-town district and empty into the lake. The pioneers found the rivers and the lake to be important means of transportation but they never dreamed of what they would mean to the commerce and industry of the new-born city in days to come. Today Milwaukee ranks the twelfth largest city in the United States with a population of approximately 800,000.

You may be surprised to know that besides being a commercial city, Milwaukee is really a beautiful residential city. Its parks and playgrounds scattered throughout the city cover an area of more than 1500 acres. These parks scattered along the lake shore and the courses of the rivers and dotted picturesquely throughout the city offer the comforts of beauty, recreation and rest to all who come to them.

Lake Park, the northeast edge of Milwaukee, is a fine expanse of woodland on Lake Michigan and its approach from the down-town district, along Lincoln Memorial Drive is one of the most beautiful features of the city. The Drive is a wide concrete boulevard extending for six miles along the lake shore, passing by the wild-life lagoon, the Coast Guard Station, the Yacht Club, the Gun Club, and many bathing beaches, and then leading directly into Lake Park from which it continues on through one of the exclusive residential districts.

Washington Park, on the west side of the city, has as its feature the nationally known Wash-

ington Park Zoo. It is the largest municipally owned animal exhibit in the United States. It boasts of a unique Monkey Island where thousands of people yearly watch the many different types of monkeys frolicking about unhampered on this island. Another new and recently completed attraction is a barless bear den, constructed as a natural refuge, separated from the onlookers only by a very deep moat from which the bear cannot escape.

Mitchell Park on the south side of town is famous for its conservatory and the wonderful displays of chrysanthemums, orchids and many rare flowers. In addition to this there is a formal sunken garden, most beautifully arranged and planned.

Be sure to avail yourselves of the privileges which Milwaukee women will afford you to see these and many other lovely parks and the surprisingly beautiful residential districts.

Down town you will find the hotels modern and clean, and convenient to all convention activities as well as to the shops and tea-rooms. The New Pfister Hotel, ("new" because it has been remodeled recently) is an old and famous hostelry where many of our country's presidents have stayed while in Milwaukee. You will particularly enjoy the noted and extremely valuable art collection on the mezzanine floor. This hotel as you know, will be our Auxiliary Headquarters.

There is another important but very different reason for your coming to Milwaukee this year. Chicago with its great World's Fair "The Century of Progress" is only eighty miles away or two short hours by bus, train, or electric. When ever before was it possible to make two such interesting and valuable trips in one?

Not only the doctors and doctors' wives but all of Milwaukee will welcome you most heartily when you come in June. Already the most minute plans for your pleasures and comforts are being made, and if you have any suggestions as to some particular service which you think our guests would appreciate, just drop a note with the suggestion to the General Convention Chairman, Mrs. Rock Sleyster, 1220 Dewey Avenue, Wauwatosa, Wisconsin, and she will see that your wish is carried out if it is in any way possible.

Remember the dates, June 12-16, and begin now to tuck away the necessary dollars to make



it possible for you to partake of the many benefits of the convention and of Milwaukee hospitality.

## OBITUARY

DR. WILLIAM WERTENBAKER

Dr. William Wertenbaker, widely known obstetrician and gynecologist of Wilmington and author of numerous technical papers devoted to the branches of surgery in which he specialized, died on March 24, 1933, in the Union Memorial Hospital, Baltimore, following two operations for carcinoma of the splenic flexure.

He was 58 years old.

Dr. Wertenbaker was born in Charlottesville, Va., September 13, 1875, the son of Colonel Charles Christian and Frances (Leftwich) Wertenbaker.

He was educated in private schools at Charlottesville and in the academic department of the University of Virginia. He studied in the medical school of that institution and in June, 1901, graduated with the degree of doctor of medicine.

After internship in various hospitals he began the general practice of medicine at New Castle where he remained until 1913 and spent the following year in research work and post-graduate study in the subjects in which he intended to specialize and settled in Wilmington.

Dr. Wertenbaker was a Fellow of the American College of Surgeons; a member of the Phi Kappa Psi, and Pi Mu Fraternities; of the New Castle County Medical Society, the Delaware State Medical Society and the American Medical Association. He was also a member of the University Club in Wilmington and the Medical Club in Philadelphia.

The physician was a member of the Medical Board of the Wilmington General Hospital and was obstetrician and gynecologist to this hospital, and also to the St. Francis Hospital. He was also the consulting gynecologist of the Delaware State Hospital.

He is survived by three children, Charles Christian, Peyton and Imogene P. Mrs. Wertenbaker, the former Imogene Peyton, whom Dr. Wertenbaker married in Washington, February 2, 1900, died several years ago.

Dr. Wertenbaker's body was sent to Charlottesville where funeral services were held on March 26, 1933.

## MISCELLANEOUS

### Results of the Work of the Commission on Medical Education

Samuel P. Capen, Buffalo (*Journal A. M. A.*, April 22, 1933), states that the Commission on Medical Education investigated exhaustively a number of situations that had long been the field of controversy. By publishing the facts it settled these controversies, at least for the present. Whether there is now, or is to be, an oversupply or an undersupply of physicians, and how far their distribution is faulty, need no longer be matters of debate. The facts are now known. It is known also that a shortened medical course to prepare a lower order of physicians to serve the rural areas is neither necessary nor practicable. The present extent of specialization is known. More circumstantial and extensive data than have ever been assembled before are now at hand bearing on that most important question for medical education: Of what does the general practitioner's practice consist? These statistical studies were reinforced by another group of investigations not quantitative but interpretative and critical, designed to furnish a base for constructive reforms. For example, there is Rappley's invaluable monograph on Medical Education in Europe. Postgraduate education is informatively and suggestively discussed and placed in a new setting. Both the medical course and pre-medical education are subjected to extended but sympathetic critiques. Obsolescent requirements, mistakes of emphasis and method are pointed out and new principles are proposed. Current practices are judged by their effectiveness in contributing to the central aim of the medical course. That aim, the commission declares repeatedly, is not to produce a finished physician but to equip the student to begin the practice of medicine. The author believes that the most important contribution of the commission was that it suggested to the Federation of State Medical Boards and to the Association of American Medical Colleges that a truce of a limited number of years be established during which any member of the Association might experiment with medical education without penalty to its graduates. The suggestion was adopted by both bodies. The response of the medical schools to this grant of freedom was immediate and widespread. More extensive and fruitful experimen-

tation has been carried on in the last seven years than in any previous period of similar length. Subsequent votes of the Federation of State Medical Boards in 1929 and 1930 confirmed this first tentative action and gave the schools a permanent charter of liberty with respect to curriculum and educational requirements. Of a piece with its intercession with the boards and the association was the commission's early decision not to recommend a new curriculum. It decided not to recommend anything. It was unwilling to advocate any procedure or device that could later be transformed into a regulation. It preferred to confine itself to a record of facts and a formulation of such principles as clearly derived from the facts. In short, the commission's point of view was evolutionary rather than bureaucratic. It took the position that to build and maintain a scheme of professional education is an endless task. There is no stopping point. Always it must be recast to meet new and unforeseen social conditions, rearranged to accommodate the growth of knowledge. Especially is this true of medical education, for year by year science recreates medicine; year by year society's demands on the physician change.

### Fetish of Triply Distilled Water

In a study by William J. Elser and Ralph G. Stillman, New York (*Journal A. M. A.*, April 29, 1933), over a period of four years and three months, no chill has followed the introduction of physiologic solution of sodium chloride into the veins of patients at their hospital. This solution was made with New York City tap water freshly distilled once, in a Barnstead still run by steam and operated during a large part of the period at the full capacity of the apparatus. This experience demonstrates with certainty that singly distilled water can be used with safety in the preparation of solutions for intravenous administration and that "triply distilled water" is truly a "fetish" in that it is a "material object regarded with awe, as having mysterious powers residing in it . . . and from which supernatural aid is to be expected." The authors conclude that the use of freshly (and properly) distilled water in the preparation of solutions for intravenous administration is essential. Solutions introduced directly into the circulation, other than physiologic solution of sodium chloride, should be administered at a rate not to exceed 5 cc. per minute.

## BOOK REVIEWS

ORGANIZED MEDICAL SERVICE AT FORT BENNING, GEORGIA. Pub. No. 21, C. C. M. C. Pp. 119. Paper. Price 90 cents. Chicago: University of Chicago Press, 1932

THE FUNDAMENTALS OF GOOD MEDICAL CARE. Pub. No. 22, C. C. M. C. Pp. 302. Cloth. Price, \$2.50: Chicago: University of Chicago Press, 1933

SURVEYS OF THE MEDICAL FACILITIES IN THREE REPRESENTATIVE SOUTHERN COUNTIES. Pub. No. 23, C. C. M. C. Pp. 173. Paper. Price, \$1.00. Chicago: University of Chicago Press, 1932.

THE INCOMES OF PHYSICIANS. Pub. No. 24, C. C. M. C. Pp. 135. Cloth. Price, \$2.00. Chicago: University of Chicago Press, 1932.

THE ABILITY TO PAY FOR MEDICAL CARE. Pub. No. 25, C. C. M. C. Pp. 107. Cloth. Price, \$2.00. Chicago: University of Chicago Press, 1933.

THE INCIDENCE OF ILLNESS. Pub. No. 26, C. C. M. C. Pp. 327. Cloth. Price, \$3.00. Chicago: University of Chicago Press, 1933.

THE COSTS OF MEDICAL CARE. Pub. No. 27, C. C. M. C. Pp. 623. Cloth. Price, \$4.00. Chicago: University of Chicago Press, 1933.

These seven publications, issued in rapid fire order by the Committee on the Costs of Medical Care, complete the series as originally planned. The concluding volume, No. 28, entitled "Medical Care for the American People," constituted the final report of the committee, and was issued, with almost unparalleled publicity, in November, 1932.

The volumes recently received are practically described by their titles. Extended reviews are not in order here; suffice it to say that these volumes contain 1786 pages of text, with a great mass of valuable data, especially pertinent now, when committees on medical economics all over the country are busy studying and planning. In this connection it is interesting to note that the full series of 28 volumes totals 4740 pages (retailing for \$34.90), and while the general profession cannot concur in many of the conclusions drawn, the series represents the largest mass of data yet assembled on this question in this country. What the series needs now is a general index volume, thoroughly cross-indexed, so that this data may be more completely and more readily available.

*This Space for Rent*

## 1789—MEDICAL SOCIETY OF DELAWARE—1933

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## NEW CASTLE COUNTY MEDICAL SOCIETY—1933

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Board of Censors: C. P. White, Julian Adair, C. C. Neese.

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Legislation Committee: G. W. Vaughan, J. D. Niles, H. L. Springer.

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## KENT COUNTY MEDICAL SOCIETY 1933

*Meets the First Wednesday*

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*Meets the Second Thursday*

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